REMARKS

The Examiner rejected Claims 1-29 under 35 U.S.C. 103(a) as being unpatentable over Oakley et al (USPN 6,080,474). As presented above, the currently pending claims are claims 1, 3-18, and 21-22, 24, 25, and 29-35.

Oakley (USPN 6,080,474) entitled "Polymeric Articles Having Improved Cut Resistance" teaches (with the underlining for emphasis):

> "A polymeric article having improved cut-resistance composed of (A) an initial polymeric article having cut-resistant properties; and (B) a cut-resistant elastomeric coating disposed on an outer surface of the initial polymeric article, wherein the elastomeric coating is composed of an elastomer and a hard filler distributed in the elastomer."

Oakley in column 4 teaches:

> "The hard filler particles may be in the form of flat particles (i.e., platelets), elongated particles (i.e., needles), irregularly-shaped particles, or round particles. Preferably, the hard filler particles are in the form of platelets because platelets are more efficient in imparting cut-resistance.
>
> The particle size of the hard filler particles preferably ranges from about 1 to about 5 microns. For flat or elongated particles, the particle size refers to the length along the long axis of the particle (i.e. the long dimension of an elongated particle or the average diameter of the face of a platelet).
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> The hard filler distributed in the elastomer polymer is preferably a metal or metal alloy, a ceramic material or a crystalline mineral. Suitable metals include, e.g., tungsten, copper, brass, bronze, aluminum, steel, iron,

monel, cobalt, titanium, magnesium, silver, molybdenum, tin and zinc. Non-limiting examples of suitable crystalline minerals include baddeleyite, chloritoid, clinozoisite, chondrodite, euclasite, petalite, sapphire, spodumene, staurolite, and clay. Suitable ceramic materials include, e.g., glass and alumina. Most preferably, the hard filler used in the elastomeric coating of this invention is alumina."

Oakley describes and teaches an initial polymeric article having initial cut resistance (Col. 3, line 31), which is made from a cut-resistant fiber formed from a fiber forming polymer and a hard filler distributed in the fiber forming polymer (Col. 5, line 30), which is the subject of U.S. Pat Application Ser. No. 08/752,297. Then Oakley in '474 teaches coating these fibers with an elastomeric coating composed of an elastomer and a hard filler distributed in the elastomer. (Col. 4). Oakley teaches that the hard filler can be various shapes including "round particles"; however these particles are distributed in the elastomer polymer coating. The hard filler particles are taught to be preferably alumina (Col 4, line 56).

The Examiner's position is that the filler material of Oakley, specifically the "round particles" of Oakley distributed in the elastomer polymeric coating makes obvious the macrospheres of the present invention.

Oakley throughout never teaches any specific structure of the particulate material, that would suggest the organization of the particulate material into any form such as an aggregate of microspheres to form a macrosphere, which is in a spherical shape. Microspheres in the present invention are spherical particles that are components of macrospheres that themselves are substantially spherical. Multiple microspheres are bound together by high density polyethylene, which is an essentially

non-elastic polymer, into a substantially spherical shape to form macrospheres. (See FIGs. 8 and 9). Macrospheres cannot and do not form themselves spontaneously out of a "soup" of "round particles" uniformly distributed in an elastomer polymer coating.

Oakley teaches distributing the "round particles" in the elastomer polymer coating, which teaches away from the present invention. Oakley is simply a mixture formed en mass, "to provide a uniform distribution of the filler in the elastomer" (Oakley col. 4 lines 63-64).

If the microspheres of the present invention are taken to be analogous to the "round particles" of Oakley, then the microspheres of the present invention according to Oakley should be distributed uniformly. However, in the present invention the microspheres are not distributed uniformly, but are instead aggregated into a specific structure (substantially spherical shape) with high density polyethylene to make macrospheres, such as taught in FIGs. 8 and 9 of the present invention. The puncture and cut resistant material is then comprised of a plurality of macrospheres. By forming the macrospheres from microspheres, the macrospheres have capture mechanisms for sharp instruments.

The teaching of Oakley of uniform distribution teaches away from and does not make obvious the present invention. Round particles uniformly distributed have no capture mechanism.

As described in the present invention microspheres are formed in a special machine such as a "Spherisator", at a temperature of 2,000 F (for alumina). (See FIG. 12 of the present invention, and page 17 lines 2 to 20.) Once formed, the microspheres are then used to fabricate macrospheres by the same special machine, the "Spheristator". The macrospheres are formed from microspheres blended with polyethylene, but at temperature of about 500 F. (See FIG. 13 of the present

invention, and page 17 line 21 to page 18 line 5, and page 18 lines 6 to 18.) The resulting macrospheres are substantially spherical aggregates of the microspheres and the polymer, as shown in FIG. 8. This structure of the macrospheres is inventive and is certainly not obvious in view of Oakley, which teaches no structure, but just a distribution of the round particles in an elastomer media. Note also that the elastomer media of Oakley is also not the same as the polyethylene teaching of the present invention. Elastomer is elastic, while polyethylene is essentially non-elastic.

Whether or not the Oakley distribution of the "round particles" in the elastomer media provides a puncture resistant property is not the issue. The Oakley material may or may not be puncture resistant. The claims of the present invention are to the specific structure of a macrosphere. This structure of the present invention is not obvious in view of the Oakley teachings.

Again, the present invention teaches a specific microstructure, which is an aggregate of microspheres forming a macrosphere, as described in FIGs. 4-11, page 14 line 5, to page 17 line 1. FIGs. 8 to 11 and page 15 line 7 to page 17 line 1, describe the macrosphere's "capture mechanism", which is a result of its specific microstructure. There is a positive puncture resistance and needle-stopping action when the needle enters and is captured by a macrosphere. Once a needle point is "captured" by a macrosphere, the sharp point is blunted by the macrosphere attached to it, which prevents the needle from passing through.

Oakley also does not teach coated porous macrospheres nor the specific methods of forming macrospheres in the present invention.

Now referring to the claims, Oakley does not teach or make obvious independent claim 1, which is repeated here in clean

form. Again by teaching distributing the particles, Oakley teaches away from the structure in claim 1. In the present invention the microspheres are not distributed throughout an elastomer polymer coating, but are instead aggregated into specific structures, and in particular into a substantially spherical shape with high density polyethylene to make macrospheres, such as taught in FIGs. 8 and 9 of the present invention. Oakley does not teach or make obvious aggregating smaller microspheres into a spherical shape and bound together by polymer to form substantially spherical macrospheres. The claims dependent on claim 1 are also not taught or obvious in view of Oakley (see analysis above).

1. A puncture and cut resistant material comprising:
a plurality of substantially spherical macrospheres;
wherein each macrosphere comprises:
a plurality of substantially spherical microspheres aggregated together in a substantially spherical shape; and
a polymer binding together the plurality of microspheres;
wherein the polymer is in interstices between the microspheres and surrounds the aggregated plurality of microspheres to form the substantially spherical macrosphere.

Oakley does not teach or make obvious the elements of independent claim 11 nor its dependent claims. Oakley does not teach a substantially spherical porous macrosphere with random pores that are coated with a polymer. Claim 11 is repeated here in clean form for convenience.

11. A puncture and cut resistant material comprising:
a plurality of substantially spherical porous macrospheres;

wherein each macrosphere comprises:

a substantially spherical porous structure comprising a plurality of random pores on the surface of said porous structure; and

a polymer coating over the porous structure;

wherein the polymer coating over the porous structure coats said random pores forming a substantially spherical macrosphere having a substantially smooth surface.

In an analysis similar to claim 1, Oakley does not teach or make obvious the elements of independent claim 18 nor its dependent claims. Claim 18 is repeated here in clean form for convenience.

18. A puncture and cut resistant surgical glove comprising:

a plurality of overlaying and stacked arrays of adjacent substantially spherical macrospheres, each macrosphere having a plurality of capture devices, each capture device adapted to capture a point of an invading sharp instrument; and

an elastomer encapsulating the plurality of overlaying and stacked arrays of adjacent macrospheres;

wherein each substantially spherical macrosphere having a plurality of capture devices comprises:

a plurality of substantially spherical microspheres aggregated together in a substantially spherical shape; and

a polymer binding together the plurality of microspheres;

wherein the polymer is in interstices between the microspheres and surrounds the aggregated plurality of microspheres to form the substantially spherical macrosphere;

wherein each capture device comprises an area of

polymer in the interstices between adjacent aggregated microspheres in the macrosphere; and

wherein the plurality of aggregated microspheres and surrounding polymer surround the macrosphere with the plurality of capture devices.

Independent claims 24 and 25 are method claims that are not taught or made obvious by Oakley. These method claims are for the method of creating the macrospheres composed of microspheres, and the porous macrospheres, respectively. These claims are repeated here in clean form for convenience.

Oakley teaches no method of producing round particles, or any method to selectively screen or separate out only the "ROUND" particles. Claim 24 is a method of producing the microspheres and then the substantially spherical macrospheres from the microspheres. Claim 25 is a method of producing the porous macrospheres.

24. A method for producing a puncture and cut resistant material comprising the steps of:

spraying droplets of molten alumina;

cooling the droplets to form substantially spherical microspheres;

spraying droplets of a solution of microspheres and liquefied polyethylene; and

cooling the droplets to form macrospheres, each macrosphere comprising microspheres aggregated together in a substantially spherical shape and bound together and coated with polyethylene.

25. A method for producing a puncture and cut resistant material comprising the steps of:

spraying droplets of molten alumina and a second material that volatizes at a lower temperature than the alumina;

cooling the droplets to form porous substantially spherical macrospheres;

tumbling the porous macrospheres with an abrasive to open up the surface and remove any intact surface film of alumina;

spraying droplets of a solution of porous macrospheres and liquefied polyethylene; and

cooling the droplets to form polyethylene coated porous macrospheres;

wherein when the second material volatizes at the lower temperature, bubbles are formed in the droplets forming the porous macrospheres. .

In summary, the present invention is not obvious in view of Oakley nor any of the references cited.

It is requested that claims 1, 3-18, and 21-22, 24, 25, and 29-35 be examined in light of the above and it is respectfully submitted that these claims are now in condition for allowance.

Respectfully submitted,

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